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August 28, 2022

**Comments on Proposed Development of Post 2026 Colorado River Operational Strategies**

Sent via email to [CRB-info@usbr.gov](mailto:CRB-info@usbr.gov)

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Dear Ms. Jerla:

Thank you for the opportunity to submit pre-scoping comments concerning guiding principles and strategies for operating the Colorado River system in the future. The Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (hereafter, Interim Guidelines) expire in 2026, and water storage in the reservoirs of the Colorado River are at unprecedented low conditions.<sup>1</sup>

We agree that “Lake Mead and Lake Powell face extraordinary risks” in the near and distant future due to the challenge of matching consumptive uses and losses with long-term supply. We further agree that the entire Colorado River system could see

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<sup>1</sup> 87 Fed. Reg. 37,884 (June 24, 2022).

“temporary or prolonged interruptions in water supplies, with associated adverse impacts on the society, environment and economy of the southwestern United States.”<sup>2</sup> These are unusually stressful times for water managers, and we appreciate the seriousness with which the Department of the Interior and the states are attempting to address the present shortfall in water supply provided by the Colorado River.

The present water supply crisis has been developing since the onset of the Millennium Drought in 2000, and it is instructive to review the successes and challenges of the Interim Guidelines in meeting the beginning of the present crisis in the early 2000s as well as the deepening crisis of the 2020s. Today, we are more than 20 years into this prolonged period of low watershed runoff that might be the new “normal” condition, and careful evaluation of lessons learned from implementation of past agreements will help Interior meet the challenges of the future.

In its Final Environmental Impact Statement in support of the Interim Guidelines, Interior identified the purpose and need of these Guidelines as an effort to provide “predictability” - “a greater degree of certainty to United States’ Colorado River water users and managers ..., thereby allowing water users in the Lower Basin to know when, and by how much, water deliveries will be reduced in drought and other low reservoir conditions.”<sup>3</sup>

By summer 2022, any “predictability” or “certainty” we hoped the Interim Guidelines might provide has evaporated. In June 2022, Commissioner Touton stated that

In the Colorado River Basin, more conservation and demand management are needed in addition to the actions already underway. Between 2 and 4 million acre feet of additional conservation is needed just to protect critical elevations in 2023.... It is in our authorities to act unilaterally to protect the system, and we will protect the system.

*Commissioner of Reclamation Camille Calimlim Touton, Hearing before the U.S. Senate Committee on Energy and Natural Resources, June 14, 2022*

This kind of a call for immediate and large reductions in consumptive use, while necessary and essential, is evidence that the goal of “predictability” in the Interim Guidelines has not been achieved. The ensuing scramble to respond to Commissioner Touton’s call to action has left water agencies and users across the Colorado River Basin

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<sup>2</sup> Id.

<sup>3</sup> U.S. Department of the Interior, Final EIS – Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead, 2007 (FEIS), p. 1-1.

with sudden and deep uncertainty about the amount of water they might have available in 2023. Uncertainty affects water users in the Upper Basin as well as in the Lower Basin.

Despite shortcomings, one important element of the Interim Guidelines looks, from the vantage point of 2022, to have been prescient. It is the concept embodied in the guidelines' very title: "Interim" - to be in place "for a long - but not permanent - period in order to gain valuable operating experience."<sup>4</sup>

We suggest that the core purposes identified in the 2007 FEIS remain valid 15 years later:

- consideration of tradeoffs between frequency and magnitude of water use reductions
- providing mainstream Colorado River users with a greater degree of predictability about the volume of water available for their use
- providing operational flexibility in the storage and delivery of mainstream Colorado River water.

Clearly, the Interim Guidelines were insufficient to protect the System under the conditions experienced during the past two decades and allowed the reservoirs to be largely drained. This experience suggests that important lessons are to be learned about the success and challenges of the Interim Guidelines. As described further below, those lessons include: (a) the need for a wider range of hydrological scenarios to be considered, (b) the need for a wider range of more flexible triggers for operational responses to declining supplies and reservoir storage; (c) basing operational responses solely on reservoir elevations leads to unsustainable overuse, insufficient incentive for conservation, and unwise draining of reservoir storage; and (d) consideration of multiple interests, while challenging to accomplish, will be essential to achieving long-term sustainability.

### **How Did We Get to the Present Situation?**

It is essential that Interior fully analyze and describe the history of watershed runoff (i.e., the natural water supply that comes from the Rocky Mountains and the streams and springs within the Grand Canyon), as well as the history of basin-wide consumptive uses and losses. The accumulated difference between supply and use led to the present water-supply crisis. There must be a commonly understood history and quantification of basin-wide supply and demand that serves as a foundation for an analysis of the

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<sup>4</sup> Department of the Interior, Record of Decision for the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, December 2007, p. 2.

effectiveness of the Interim Guidelines and our present effort to improve water management. We recognize that Interior will conduct its own careful analysis of the history of 21st century supply and demand, and we offer our preliminary understanding of this history in an effort to encourage comprehensive conversation.

Consumptive water uses and losses have exceeded the natural supply throughout the 21st century. We used Reclamation's various consumptive use reports and estimates of reservoir evaporation to calculate basinwide consumptive uses and losses. We compared those data with the natural water supply, determined by adding together Reclamation's estimates of Lees Ferry natural flow and USGS measurements of inflows within the Grand Canyon (Figure 1). We also calculated the difference between consumptive uses and losses and natural supply for the period between 1988 and 1998 that included a relatively dry period followed by a few wet years and for the entire 21st century (Figure 2).

**Consumptive Uses and Losses and Natural Water Supply to Lake Mead 1981-2022**

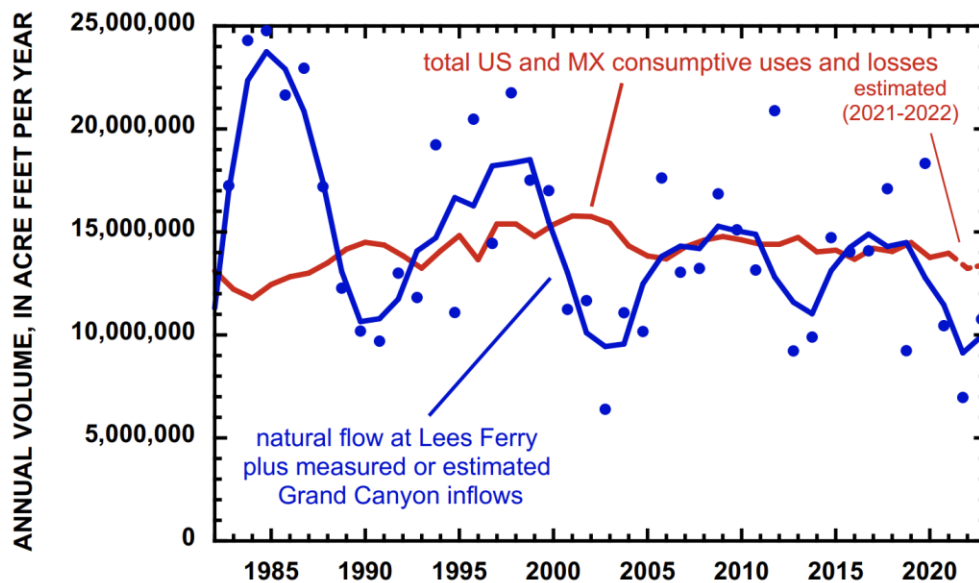


Figure 1 - Graph showing natural water supply and basin-wide consumptive uses and losses<sup>5</sup>

Figure 1 shows that consumptive uses and losses have changed relatively little during the past 40 years and have fluctuated much less than the natural supply. Total basin-wide consumptive uses and losses averaged 14.2 maf/yr between 2003 and 2020 after California reduced its consumptive use from 5.4 maf (2002) to 4.4 maf (2003). Consumptive uses and losses between 2003 and 2020 did not progressively increase or decrease and were within  $\pm 4\%$  of the mean for that period. In contrast, there were cycles of somewhat wetter and somewhat drier hydrology. Natural water supply was low between 2000 and 2004, especially in 2002 and 2004, and consumptive uses and losses greatly exceeded supply. Natural runoff exceeded consumptive uses and losses in 2005, but they were less than basinwide uses in 2006 and 2007. This prolonged period when use exceeded supply depleted storage in Lake Mead and Lake Powell by  $\sim 50\%$  from conditions in 1999. Subsequently, there were years of small surplus and small deficit, but total storage in Mead and Powell was only 6% greater in 2019 than it had been in 2008 (Fig. 2). The onset of a new succession of very dry years beginning in 2020 plunged the basin into its present water-supply crisis.

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<sup>5</sup> Calendar year total consumptive uses and losses were calculated from Colorado River Basin Consumptive Uses and Losses Reports, provisional or revised, Upper Colorado River Basin Consumptive Uses and Losses Reports, and Colorado River Accounting and Water Use Reports: Arizona, California, and Nevada. Mainstem reservoir evaporation in the Lower Basin after 2005 was assumed to be 1.1 maf/yr, which was the average reported between 2001 and 2005 in the Colorado River Basin Consumptive Uses and Losses Report 2001-2005. Water year natural flow at Lees Ferry was as reported by Reclamation in provisional data updated in May 2022, including an estimate of natural flow in 2022. Water year inflows between Lees Ferry and Lake Mead after 1990 were calculated as the difference between the annual volume of flow at Lees Ferry (USGS gage 09380000) and near Peach Springs (USGS gage 09404200). Prior to 1990, these inflows were assumed to be 0.70 maf/yr, which is the long term average. On Figure 1, individual years are plotted as blue circles, and a smoothing line through these data is intended to facilitate observation of cycles of somewhat wetter and drier conditions. The smooth line was calculated using the locally weighted least squares error method in which the curve is a best fit through the center of 10% of the data. This is a robust fitting technique that is nearly insensitive to outliers.

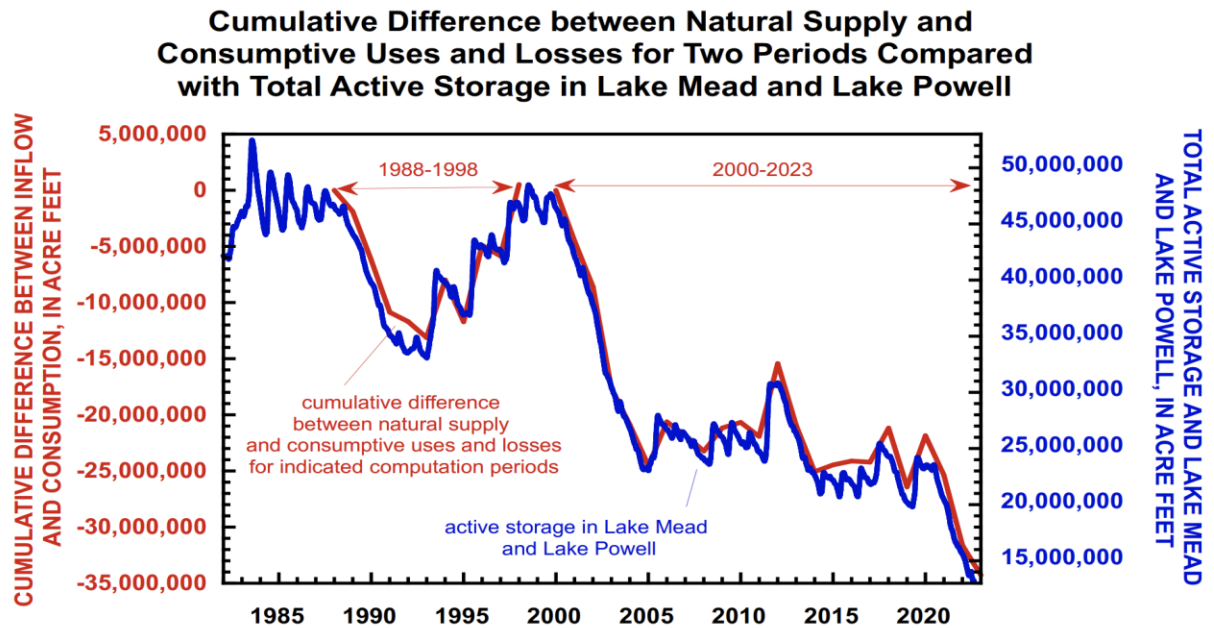


Figure 2. Graph showing cumulative difference between natural water supply and total consumptive uses and losses for two periods (red lines) and cumulative active water storage in Lake Mead and Lake Powell (blue line).<sup>6</sup>

This 21st century history of prolonged and increasing deficit, computed as the difference between supply and use, contrasts with the late 1980s and the 1990s. Basinwide consumption exceeded natural supply between 1988 and 1992, depleting reservoir storage by ~14 maf, but Lake Mead and Lake Powell were refilled during the wet years of 1993, 1995, 1997, and 1998.

The contrast between the history of deficit and surplus in water supply in the late 20th century and during the ongoing Millennium Drought is telling. There were a sufficient number of relatively wet years in the 1990s to recover reservoir storage. Since 2000, the relatively wet years have been fewer in number, and there has been no significant recovery in reservoir storage. Should this pattern persist as the new climatic “normal,” we see no alternative but to reduce basin-wide consumptive uses and losses so there is

<sup>6</sup> The two computation periods span 1988 to 1998 and 2000 to 2023. The cumulative deficit for the Millennium Drought was assumed to be zero in 2000, and the first deficit in supply occurred in 2001. Data sources are the same as those in Figure 1. Cumulative active reservoir storage was as reported by Reclamation, [https://www.usbr.gov/uc/water/hydrodata/reservoir\\_data/site\\_map.html](https://www.usbr.gov/uc/water/hydrodata/reservoir_data/site_map.html).

adequate opportunity to recover reservoir storage after a few years of deficit and reservoir draining.

Future consideration of water management policy should be based on a refined analysis, potentially with more accurate data than is currently available to the general public, to describe this history of supply and demand and to evaluate why basinwide consumptive uses and losses changed little during sustained dry periods despite the Interim Guidelines.

In our view, the Interim Guidelines failed to ensure that the reservoirs refilled, and the reservoirs remained in a precarious condition between 2008 and 2019, and now risk being fully drained, because consumptive uses greatly exceed natural supply. Our analysis is based on publicly available data, and we encourage Reclamation to undertake its own analysis in search of these simple facts: What is the natural water supply derived from the Upper Basin and from the Grand Canyon? What are the total basinwide uses and losses? What triggering mechanisms must be in place that allow reservoir storage to recover, and what must be the magnitude of consumptive use cutbacks to sustainably manage the system?

### **Proposed Goals for Post 2026 Guidelines**

With a clear understanding of the history of water supply and demand in the 21st century, and a clear understanding of the inadequate performance of the Interim Guidelines, we suggest the following as goals for the post 2026 Guidelines:

- A basin-wide commitment that water supply and use will balance, that is, long-term average consumptive uses and losses will not exceed the average natural water supply provided by the watershed.
  - We recognize that there are multiple devils in the details of this recommendation including the duration of years during which balance is sought and the mechanisms by which reductions in use must be implemented to maintain a balance. Nevertheless, there is no alternative to balancing the system. We estimate that the natural supply for the period 2000-2022, including inflows within Grand Canyon, has been 12.8 maf/yr, and there is no alternative but to at least reduce basinwide water use to that value. Should watershed runoff decline even further, then basin-wide use must be further reduced.
- Reservoirs must be refilled after sustained periods of draining. Refilling of reservoirs only occurred for relatively short periods in the 21st century and the



- onset of the most recent very dry conditions led to the present water-supply crisis – consumptive use exceeding natural supply at a time when the reservoirs are mostly drained. Thus, if relatively wetter periods return, consumptive uses must remain low to recover reservoir storage.
- Mechanisms for triggering large magnitude reductions in consumptive uses and significant changes in reservoir operations must be sufficiently adaptive that the rules can be applied to a wide range of future hydrologic conditions
  - Incentives for conservation and reduced usage beyond the mandatory requirements of the new Guidelines must be included and demonstrated to be effective
  - The Guidelines must include flexibility and specific procedures to deal with even more severe challenges if the policies to reduce use and losses prove insufficient
  - Equity in allocating necessary reductions in use will be ensured – equity among different economic sectors (agricultural, municipal, industrial, recreational), different geographic areas, and for Native American Tribes must be evaluated and explored as part of the NEPA analysis
  - Specific environmental goals should be established for the river system and environmental impacts considered in developing policy related to balancing supply and demand
  - The parameters used to determine operations, including evaporation, consumptive use, and Lower Basin tributary usage, will be accurate and transparent, using agreed-upon data sets
  - Tribal water rights, interests and values will be fully recognized and incorporated

We recognize that these goals are broad, extending beyond what some in the basin are advocating - a narrow reconsideration of reservoir operations. We are sympathetic to the burden that the breadth of analysis we are advocating will place on the dedicated and hard-working staff at Reclamation and the Department of the Interior during the next years. But anything less than an expansive view of the task at hand will fall far short of what is needed at this moment in history.

### **Substantive Elements and Strategies for Post 2026 Operations**

Substantive elements and strategies that should be considered in the NEPA process for the proposed Post 2026 Guidelines include:

1. Balancing average water supply with water usage
2. Realistic, accurate, and transparent parameters should be utilized for operation of the system, including Upper Basin consumptive use measurement



3. Upper Basin incentives for conservation, similar to ICS
4. Tribal water rights, values, and access
5. Consideration of the complete spectrum of environmental impacts in determining discretionary operations
6. Shortage and conservation criteria based on the impacts to total system reservoir storage, the response to actual observed hydrology, and the recovery of storage to provide security, reliability, and predictability for the system.

Each of these elements is described in more detail below.

### **1. Balancing average water supply with water usage**

The most essential, and the most difficult, component of managing the Colorado River in the future, including development of the Post 2026 Guidelines, is the need to balance total basin-wide consumptive uses and losses with the variable, but declining, natural runoff. There will be tremendous challenges in identifying policies that can be adapted to the unavoidable uncertainty of predicting the sequence of future wet and dry years and identifying policies that can be quickly implemented in the event of an unusually wet year or of a continued series of unusually dry years. Water users desire certainty in defining their available water supply, yet the uncertainty of the future requires adaptive policies and reservoir operations. There is a clear need to reduce total basin-wide consumptive uses and losses, and the strategies to be used under progressive declining runoff and under the stress of back-to-back years of unusually low runoff must be quantified in operational directives.

We do not presume to prescribe how shortages in the available water supply ought to be divided among the watershed's users. It is clear, however, that policies on shortages and diversions must be grounded in an adaptable framework that recognizes the deep uncertainty in future hydrologic conditions. We believe that a wide range of future runoff conditions ought to be considered that not only include a prolonged natural runoff at Lees Ferry of ~12 maf/yr, but also scenarios in which average runoff is even lower and in which critically low individual years or periods are included. We also suggest that policies be developed concerning how to manage an unusually wet year that occurs in the midst of drought that provides opportunity for recovery of reservoir storage.

Future reservoir operations should also seriously evaluate how to reduce evaporative losses that are approximately 2 maf/yr across the system. Sufficient data are available to analyze the tradeoffs in the location of reservoir storage – in Lake Mead, in Lake Powell, elsewhere – associated with evaporative losses.

However reduced consumptive uses and losses are achieved, components of an equitable and accurate balance between supply and demand should include:

- Equity in distributing the burden of reduced usage must be achieved. Equity is in the eye of the beholder, but consideration must be given to the original Compact goals, allocations, and requirements, sharing the burden of impacts among economic sectors, particularly municipal and agricultural users, commitments to Native American tribes, and existing investment-backed expectations. The impact of climate change on river system flows, not anticipated at the time of the Compact, the Treaty with Mexico, or any of the three major federal authorizing acts, is part of this equity equation.
- Multiple scenarios of potential system-wide supply on a rolling average basis, together with the amount of stored water available to buffer volatility, should be considered, and resulting allocations and reductions provided. The Interim Guidelines did not ensure rebuilding reservoir storage between 2008 and 2019 and left water users in an unacceptably vulnerable position when the latest phase of unusually dry conditions began in 2020. Policies that are adaptable in the future should recognize the uncertainty of anticipating the next year's runoff and of the need to maintain adequate reservoir storage to sustain the challenge of persistent drought. The use of inalterable fixed allocations is inconsistent with wise management of a deeply uncertain future, and there is no option but to develop adaptive policies.
- Upper Basin stream flow should be used as a component in triggering different operating regimes, not solely reservoir elevation levels.
- Utilization of combined reservoir storage as a metric (as depicted in Fig. 2), rather than reservoir elevation of Lake Powell and/or Lake Mead.
- In summer 2022, the basin finds itself in the midst of a profound water crisis. Nevertheless, water users still publicly consider future increases in water use, especially in the Upper Basin where consumptive water uses are less than half those in the Lower Basin. It should be recognized that there is little, if any, opportunity to increase consumptive water use in any state or any economic sector should watershed drying patterns persist. Aspirational demand for continued increase in consumptive use should not dictate future operations. At present, water development in the basin is a zero-sum game, in which any new depletion from the river must be matched with retirement of some existing use elsewhere. We suggest that this kind of a planning approach be used in considering future water development.
- All water supplies and depletions should be accounted for, including, without limitation, seepage around Glen Canyon Dam that produces inflows between the

Dam and the Lees Ferry gage, inflows in the Grand Canyon between the Lees Ferry gage and Lake Mead, evaporation from reservoirs, and the effect of depletions in Lower Basin tributaries, including the Gila River. Best available data on these uses and losses should be utilized, and accurate measurement of actual usage and flows should be transparently maintained and made available to the public in a timely fashion.

- Planning for the future must include significant improvements in measurement of stream flow, evaporation, transmission losses, and evapotranspiration. We suggest that significant investment in improved measurement of water flows and losses be part of any program of managing the Colorado River. The 5-point plan of the Upper Colorado River Commission recognizes this urgent requirement and proposes the use of the DCP funding provided by the Bipartisan Infrastructure Law to accelerate implementation of appropriate measurement tools.<sup>7</sup>
- Annual evaporation from the major system reservoirs (Powell, Flaming Gorge, Aspinall, Mead, Mojave, and Havasu) is a significant basin-wide consumptive use. Depending on reservoir levels, total annual evaporation from these reservoirs can vary from 1.2 to 2 million acre-feet per year. The allocation of evaporative losses to individual states has been a long-standing issue of dispute among the Lower Division States and between the basins. The 1948 Upper Basin Compact allocates net evaporation on the CRSP initial units to the individual Upper Division States in accordance with their basic apportionments. There is no similar allocation of the evaporation to the Lower Division states from Lakes Mead, Mojave, and Havasu, but it is an obvious alternative for reducing the Lower Basin's long-term structural deficit. Given the importance of evaporation in the entire basin, it is important for Reclamation to be more transparent and consistent with how evaporation is measured, reported, and used in the Consumptive Uses and Losses Reports, decree accounting reports, and system models (24-month study and CRSS). Currently there are differences between how evaporation is reported between the Upper Basin and Lower Basin reservoirs, and updated evaporation studies are either in progress or have been completed, but the results and data have not yet been made public and to our knowledge are not yet being used. We recommend that before the different basin stakeholders begin to develop and analyze different post-2026 management strategies, Reclamation issue a clarifying report on system reservoir evaporative losses, including how they are currently handled, what

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<sup>7</sup> Upper Division States 5 Point Plan for Additional Actions to Protect Colorado Storage Project Initial Units, Letter of July 18, 2022, Chuck Cullom, Executive Director, Upper Colorado River Commission, <http://www.ucrcommission.com/wp-content/uploads/2022/07/2022-July-18-Letter-to-Reclamation.pdf>.

- changes will be made in the future, and recommend a more consistent basin-wide approach for measuring and reporting system reservoir evaporation.
- All system losses, conveyance losses and evaporation, should be accurately reported. This includes, for example, riparian system losses as water flows from Hoover Dam down to water user diversions. With respect to evaporation, the full extent of gross evaporation from all reservoirs should be reported and accounted for. Although there are legal and administrative rationale for reporting net evaporation [total surface evaporation less the estimated evaporative and evapotranspiration losses had the reservoirs not been built] from Upper Basin reservoirs, this value does not represent the actual evaporation that occurs from Lake Powell and other CRSP facilities. It will not be possible for stakeholders to evaluate the tradeoffs in consumptive uses and losses unless they are accurately reported.

## **2. Realistic, accurate, and transparent parameters should be used for operation of the system, including Upper Basin consumptive use measurement**

To manage a scarce system, it is essential that both river managers and water users have accurate and transparent measurements of water use, based on common methodologies and metrics. The largest consumptive use in the Colorado River Basin is agricultural irrigation, accounting for 70 to 80 percent of the total use by most estimates. But currently and historically, the consumptive use associated with agricultural irrigation is estimated imprecisely, and these estimates are subject to much more uncertainty and argument than are consumptive use estimates for other types of water uses.

In the Upper Basin, consumptive use has been estimated based on broad parameters of acreage irrigated, climate variables, and general county-wide crop mix factors, using decades-old equations and coefficients. Reclamation's Upper Basin consumptive uses and losses reports are usually about two years behind, with more than ten years of data continuing to be labeled "provisional." Reported figures sometimes change significantly after the original publications. The data in the publicly available reports are sometimes not the same as the data used internally by Reclamation. None of the Upper Basin states agrees with the methodology utilized by Reclamation, or the resulting consumptive use estimates. This is unacceptable.

In order to have an adequately managed system, it will be essential for the states, Tribes, major water users, and Reclamation to collectively endorse an appropriate methodology, resulting in an agreed-upon data set. It is not possible to closely control an over-allocated system if the figures representing the largest use in the system are

subject to substantial error or are disputed. In addition, an unbiased measurement of the impact of low runoff years on physical and legal availability of water and resulting usage in the Upper Basin is necessary to a quantification of assertions of reduced usage that can be factored into overall system management.

The determination by the Upper Colorado River Commission to adopt the Automated METRIC (eeMETRIC) method to determine the consumptive use associated with irrigated agriculture in the Upper Basin is a significant step forward.<sup>8</sup> Use of eeMETRIC for the purpose of modeling and compliance with the 1948 Upper Colorado River Basin Compact will provide consistency across the basin and allow for more precise water management. The evaluation of any proposed set of Post 2026 Guidelines should include and be based on this uniform process of determining consumptive use. Steps should be taken to ensure timely availability of data and modeling, transparency in reporting, and recalculation of other estimates dependent on consumptive use parameters.

The transition to the use of eeMETRIC will need to be carefully managed by Reclamation in order to provide consistency in modeling and analysis. The natural flow data base, CRSS parameters, and tree ring hydrology are all based on the older methodology. In order to have consistency in measurement and a good basis for future river management, it is essential that there be a long-term recalculation of annual Upper Basin agricultural consumptive uses, which is critical to the recalculation of natural flows.

### **3. Upper Basin incentives for conservation, similar to ICS**

The inclusion of the provisions in the 2007 Guidelines for an Intentionally Created Surplus (ICS) program has been a successful incentive for innovative conservation projects in the Lower Basin such as Brock Reservoir and the Metropolitan Water District's Regional Recycled Water Program. In the Upper Basin, there are no similar ICS provisions or incentives and consequently, there are no similar conservation projects. The Post 2026 Guidelines should incentivize cooperative conservation projects in the Upper Basin that are in addition to, or in substitution for, any mandatory reductions, through ICS-like provisions or functionally similar arrangements designed specifically for the Upper Basin. An example of such an incentive would be to give individual Upper Division States the opportunity to bank conserved consumptive uses in system storage (all CRSP reservoirs and Lake Mead), then make the water available for either future compact compliance or for transfer to another state in either basin.

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<sup>8</sup> Resolution of the Upper Colorado River Commission - Consumptive Use Measurement in the Upper Colorado River Basin, June 14, 2022.

As with the Lower Basin, Upper Basin “ICS” rules should be flexible and voluntary. The Bureau of Reclamation should be given the flexibility to store Upper Basin and Lower Basin ICS pools in any available system storage, without charge, subject to transparent accounting rules. How contributions to the Upper Basin ICS pools would be made and managed within a state would be up to the individual states, but the rules should be flexible enough to allow for multi-state projects.

#### 4. Tribal water rights, values, and access

The status of federal reserved water rights varies considerably among the thirty Tribes in the Colorado River Basin. Some Tribes have rights determined by the decree in *Arizona v. California*; others have reached settlement on their claims. The Colorado River Water and Tribes Initiative reports that twelve Tribes have unresolved water rights claims. Some Tribes have settled their claims in one or more states but have unresolved claims in others. Many Tribes with settled or adjudicated water rights are not able to put the full amount to use as a result of insufficient or wholly lacking infrastructure or other reasons. Tribes have quantified rights to approximately 3.2 million acre feet of water in the system, approximately one-quarter of the entire average natural flow of the watershed.<sup>9</sup>

We are fully cognizant of the conflict between full development of currently unused or unquantified Tribal water rights and the need to reduce overall water uses in the Basin. We believe, however, that an appropriate balance of water supplies and uses cannot ignore the unquestioned right of Tribal nations to the water necessary to fulfill the purposes of their reservations. There is a significant opportunity to use flexible tools to accommodate both the Tribes’ interests in benefitting from their recognized water rights and the interests of non-Tribal water managers to identify reliable sources to balance the Basin’s water budget.<sup>10</sup> Both the Basin states and the Department of the Interior are committed to ensuring that Tribal rights are appropriately considered in the development of the Post 2026 Guidelines.

Only Tribal leaders and spokespersons can appropriately convey their interests and desires for the Post 2026 Guidelines, and we do not purport to speak for any Tribe. We

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<sup>9</sup> Water and Tribes Initiative | Colorado River Basin, The Status of Tribal Water Rights in the Colorado River Basin, Policy Brief #4, April 9, 2021, available at [https://www.waterandtribes.org/\\_files/ugd/17c3c8\\_1fa6790c664842249959f156b927d10d.pdf](https://www.waterandtribes.org/_files/ugd/17c3c8_1fa6790c664842249959f156b927d10d.pdf).

<sup>10</sup> Water and Tribes Initiative | Colorado River Basin, Developing the Next Framework to Manage the Colorado River: Flexible Tools to Benefit Tribes and the Basin, Policy Brief #5, August 2022, available at [https://www.waterandtribes.org/\\_files/ugd/1c5bb7\\_c6557dd8e23c4c5d848590e7d36efe96.pdf](https://www.waterandtribes.org/_files/ugd/1c5bb7_c6557dd8e23c4c5d848590e7d36efe96.pdf).

suggest, however, that impacts on Tribal rights, including those not yet quantified and those not yet put to use, must clearly be considered in the examination of any proposed Post 2026 Guidelines. In modeling the impacts of any proposed alternative, the settlement or other quantification of currently unresolved Tribal water rights should be anticipated, together with full use in some form of currently unused entitlements.

Tribes are also interested in rectifying inconsistent and paternalistic limitations on their ability to market and lease their water rights in the same manner as other water rights holders in the Basin. The impact of such additional flexibility, and support for it, should be considered, including recognition that Tribal water rights can play an important and positive role in balancing the system, as demonstrated in the Lower Basin Drought Contingency Plan. Interested Tribes should have access to ICS or the equivalent future incentive programs in both the Upper and Lower Basins, in the same manner as other major water users. In addition, Tribes must have the necessary technical assistance to allow them to evaluate for themselves the potential for adverse impacts to their water rights.

A traditional injury analysis may not be sufficient, however, to recognize and effectuate Tribal interests in the Basin. Traditional governance and institutional systems have given rise to barriers that have prevented Tribes from resolving outstanding claims, fully utilizing recognized rights, and obtaining full access to clean drinking water. The Post 2026 Guidelines should identify these barriers and include methods for removing them. To the extent that Tribes propose measures to effectuate spiritual and cultural values associated with water, these measures should be examined as part of the scope of the environmental investigation.

Finally, access to clean and safe drinking water is a basic human right, but one that is not universal for Tribal households in the Colorado River Basin. It is an essential component of the federal government's treaty and trust responsibility to Tribes. Ensuring access to clean drinking water for all Tribes in the Basin must be part of the scope of any Post 2026 Guidelines.

## **5. Consideration of environmental impacts in determining discretionary operations**

Since the 2007 Guidelines were established, significant additional data and research have resulted in much better information and knowledge concerning the emerging environmental resources in Lake Powell as reservoir storage declines as well as the impact of reservoir releases from Lake Powell on downstream environmental conditions. The Grand Canyon Protection Act requires that Glen Canyon Dam be



managed “in such a way as to “protect, mitigate adverse impacts to and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use.”<sup>11</sup>

Unusually warm reservoir releases in summer 2022 and the discovery of young-of-year smallmouth bass in Glen Canyon Dam’s tailwater place the Grand Canyon river ecosystem at a potential tipping point in which river resources that have been the focus of management for the past 50 years may be in jeopardy. The linkage between storage volumes in Powell and ecosystem conditions in Grand Canyon are well documented, and the impacts of any proposed alternative strategy of reservoir operations must be evaluated. The effects of dam operations on temperature, dissolved oxygen, and nutrients, all part of the “affected environment,” have the potential to affect natural resources and the values for which the Park and Recreation Area were established. Declining reservoir recreation and improving river recreation in the inflow areas of Lake Powell are also issues for consideration under the Grand Canyon Protection Act.

Establishment of appropriate environmental goals for the system should be a component of the Post 2026 Guidelines, and not solely tied to Endangered Species Act requirements. Although the potential for some environmental impacts was recognized in the EIS for the 2007 Guidelines, subsequent analysis and monitoring demonstrates that certain significant impacts were inadequately evaluated at that time. These impacts include:

- The effect of equalization releases on sand resources in Grand Canyon;
- Requirements that affect reservoir elevation of Lake Mead and control the emergence of Pearce Ferry Rapid and other blockages to upstream migration of undesirable nonnative reservoir fish into Grand Canyon;
- The temperature of releases from Lake Powell that have a strong impact on the aquatic ecosystem in Grand Canyon
- The elevation of Lake Powell that affects the emergence of Paiute Falls in the San Juan arm, the potential emergence of a similar falls near Hite, and the mobilization of sediment and nutrients now stored in the deltas of the reservoir; and,
- The emergence of valuable resources in Glen Canyon and lower Cataract Canyon, such as new rapids and scenic wonders.

As a result of the drawdown of Lake Powell during the last decade, areas of Glen Canyon are emerging from inundation that have not been visible since the 1960s. The unique

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<sup>11</sup> Grand Canyon Protection Act of 1992, P.L. 102-575, Sec. 1802(a).

and spectacular formations and scenery of Glen Canyon now being revealed again remind us that it is unlikely the Dam would be constructed if it were being considered today. The reemergence of this incomparable and treasured landscape and its importance to national and Tribal heritage and values means that consequences to it from proposed operations must also be considered in the environmental impact analysis.

New agreements about managing the Colorado River in an uncertain future of declining natural supply should also explicitly consider the impacts of new policy decisions on efforts to sustainably create a healthy riparian environment in the delta in Mexico. Since the pulse flow release from Morelos Dam in 2014, the governments of Mexico and the U.S. and many NGOs have worked tirelessly to create new riparian environments that can be sustained by targeted releases. A future that includes declining natural flow, increasing demand for utilitarian water use, and broader access to water supply by the basin's stakeholders may jeopardize the present efforts in the delta. The impacts of new water management policy on the delta must be considered.

**6. Shortage and conservation criteria based on the impacts to total system reservoir storage, the response to actual observed hydrology, and the recovery of necessary storage.**

Natural flows into Lake Mead in a balanced system should roughly equal the consumptive uses and losses. Available data, however, demonstrates that consumptive uses have exceeded flows since 2000 by an average of 1-2 maf/yr during this period, and 3-7 maf/yr between 2020 and 2022. Reservoir storage has not been significantly replenished, and there has been an inexorable drawdown, as shown at the beginning of our comments.

This imbalance and the resulting current storage crisis at Lake Mead and Lake Powell have exposed basic flaws with the 2007 Guidelines and Lower Basin DCP. First, Lower Basin shortage provisions and DCP "contributions" are based on storage levels in Lake Mead only, ignoring total system storage and recent actual hydrologic conditions. Above average releases from Lake Powell, dictated by Lake Mead elevations, may have subsidized overuse in the Lower Basin and have not allowed for retention of a storage buffer in the two reservoirs. As a result, the USBR was forced to take extraordinary measures in Water Year 2022 to reduce Glen Canyon Dam releases to 7.0 maf, 480,000 acre feet less than what was dictated by the 2007 Guidelines, but necessary to minimize the risk of Lake Powell dropping below minimum power pool elevation. Furthermore, 500,000 acre feet of additional water is being released from Flaming Gorge Reservoir to Lake Powell, again to maintain water-supply security there. Even with those

extraordinary actions, however, Lake Powell might be lower in WY2023 than at any time in its history if the coming winter is dry.<sup>12</sup>

Second, the 2007 Guidelines tiered shortage provisions do not allow for the recovery of a minimum level of acceptable storage in the overall system. For example, after the 2012/13 drought, the annual release from Glen Canyon Dam in 2014 was 7.48 maf. Water Year 2014 was slightly below average with a natural flow at Lee Ferry of 14.0 maf (about 97% of the long-term average), but enough to recover Lake Powell storage above the 3575' level triggering an above average 9.0 maf release in 2015. Hydrologic conditions from 2015-2017 were similar, averaging about 97% of the long-term average. The 9.0 maf annual releases continued through Water Year 2019. The 9.0 MAF releases kept Lake Mead high enough to avoid Tier One shortages, but also limited storage recovery at Lake Powell. From 2015-2017, system storage (Mead plus Powell) only gained 2.4 MAF (Fig. 2), not enough to avoid the current storage level crisis.

The criteria used to turn “on” and “off” shortages need not be the same. The “off” criteria should be based on a combination of hydrologic and system reservoir levels that recovers sufficient storage to survive the next sequence of very dry years.

### **EIS Contractor**

Thoughtful consideration should be given to the potential role of a private contractor in the preparation of the Environmental Impact Statement that is associated with development of Post 2026 Guidelines. We recognize that a contractor provides significant potential value in ensuring completion of this EIS in a timely manner, and we recognize that Reclamation may not have the staff to complete this EIS on its own.

The challenges in preparing the EIS for the Long Term Experimental and Management Plan for Glen Canyon Dam (LTEMP), however, demonstrate that there are limitations in relying on a contractor to conduct the type of high-level water-supply and environmental impact analyses that are necessary here. In the course of completing the LTEMP EIS, the Grand Canyon Monitoring and Research Center of the US Geological Survey (GCMRC) played an essential role in providing modeling support for the prediction of outcomes to the Grand Canyon fishery and other river natural resources. It is clear that similar high-level scientific support will be needed to adequately evaluate alternative reservoir operations proposed for the Post 2026 Guidelines, and Reclamation should not assume that an independent contractor will be able to provide this expertise.

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<sup>12</sup> Reclamation, August 2022 24-Month Study, Minimum Probable Inflow Scenario, available at [https://www.usbr.gov/lc/region/g4000/24mo/2022/AUG22\\_MIN.pdf](https://www.usbr.gov/lc/region/g4000/24mo/2022/AUG22_MIN.pdf).

We suggest that the new EIS be prepared by an integrated team that might include an independent contractor, but that also accesses federal and state (and perhaps university) scientific and operational expertise so that an appropriate level of understanding and analysis is used to evaluate alternative reservoir operations policy. Relevant expertise can be found in the state administrative agencies, GCMRC, the staff of the Upper Colorado and San Juan endangered species recovery programs and the Lower Basin MSCP, and the faculty and research staffs of some universities. Similarly, analytical support will be needed to evaluate the impacts of reservoir operations on hydropower generation and system-wide water resource operations. Preparation of this EIS cannot be merely delegated to a private contractor with the assumption that the contractor will have the capacity to analyze all relevant scientific and engineering issues.

### Conclusion

Balancing supply and demand and ensuring the sustainability of the Colorado River system is Job 1 for the Post 2026 Guidelines. We recognize the complexity of that seemingly simple task. We stand ready to be of assistance in this process and appreciate the opportunity to submit these pre-scoping comments. Any of us is available to discuss them further.

Sincerely,



John Fleck



R. Eric Kuhn



John C. Schmidt

## [EXTERNAL] Pre-scoping Comments

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 1 attachments (797 KB)

2022-08-28 JS EK JF pre-scoping.pdf;

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Carly et al -

On behalf of Eric Kuhn, Jack Schmidt, and myself, I'm grateful for the opportunity to submit the attached comments regarding the proposed development of Post-2026 Colorado River Operational Strategies.

Regards,  
John

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[Science Be Dammed: How Ignoring Inconvenient Science Drained the Colorado River](#), University of Arizona Press

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